

GLUING UNIT FOR ONE TERMINAL EDGE OF A LOG

The present invention relates to a gluing unit of the terminal edge of a log.

5 In order to realise toilet paper rolls, kitchen paper rolls and the like called "logs", it is currently known that once the paper has been wound, glue must be distributed or positioned in various manners either on a terminal edge of the single formed log, or on a
10 portion of the roll comprising the log to obtain stable reciprocal attachment on the finished log.

In fact the glue is used to attach the final edge and the remaining part of the winding that can then be cut into several small rolls of the required limited size,
15 to obtain a number of finished rolls.

At the moment, glue is applied either by means of glue spray distributors or by passing the final edge, or the roll over a slot through which the glue is distributed by overflowing once the final edge has been unwound for
20 the appropriate portion from the rest of the winding.

Although these well-known gluing units work sufficiently well, it can happen that they do not feed or distribute the glue in a uniform manner or exactly in the position required.

25 In fact, using glue spray distributors the glue being emitted through said distributors, the glue is not

always spread in a straight and continuous manner and can also create glue deposits on undesired parts of the paper or it also tends to soil the whole machine. Moreover, it must be considered that distributors are
5 delicate and need to be controlled and adjusted so that they do not use too much or too little glue.

On the other hand, when the glue is distributed using the "overflow" method, over which the final edge of the log, or the log itself is passed, soiling can occur
10 throughout the whole machine and even in the log, due to both the quantity of glue as well as the glue that is disseminated by the paper, or that accidentally overflows from the slot.

It must also be considered that the gluing units of a
15 terminal edge of a log are particularly complicated from a constructive point of view in general, and from the viewpoint of the interaction between the various parts that contribute to log travel, unwinding the terminal edge, or at least a portion of it, and
20 permitting the application of the glue on the edge.

The aim of the present invention is therefore to find a different solution to the aforesaid technical problem of correct distribution or positioning of the glue, thus resolving the problems of prior art related to the
25 whole gluing unit of the terminal edge of the log.

Another aim is to realise a unit adapted to perform the

aforesaid task that is particularly simple to implement even in large-scale production.

These aims, according to the present invention are achieved by realising a gluing unit for a terminal edge
5 of a log as described in the appended claim 1.

Further recognisable and special characteristics of the present invention are the object of the subordinate claims.

The characteristics and advantages of a gluing unit of
10 the terminal edge of a log according to the present invention will be made clearer and more obvious in the following description provided as an example that is by no means limitative, in an embodiment with reference to the appended figures wherein:

15 Figure 1 is a side elevation of a partial section of a unit according to a first embodiment of the present invention in a first operative position wherein the log is blocked between one unwinding roller and a conveyor belt,

20 Figures 2 and 2a are similar views to that shown in figure 1 in a second operative position, during the following stage, with two logs being fed along the path towards the position where the glue is applied,

Figure 3 is a similar view to that shown in figure 1 in
25 a third operative position with three logs being fed along the path towards the zone where the glue is

applied,

Figure 4 shows how a first log being fed in the third operative position, is placed in order to take up the glue, and

5 Figure 5 shows in a final section of the third operative position, how the said first log being fed is reversed to receive the glue.

A gluing unit of the terminal edge of a log is shown with general reference to figures 1 - 5, and identified
10 throughout with numeral 11, mounted in a machine for log forming. A support structure 12 of the machine provides for a sloped feeder surface 13 to feed the logs (14) one after the other, indicated in the various positions by 14', 14'', 14''', etc, for easier
15 understanding, after their arrival from a previous rewinding machine positioned upstream.

At the end of the sloping feeder surface 13 is envisaged a star type rotating sorting device 15 provided with a series of pockets 15a, to receive each
20 individual log 14, and which directs the logs one after the other towards the following actual gluing unit 11.

According to the present invention, this gluing unit 11 envisages a first unwinding roller 16, driven by an independent motor and positioned lower than the first
25 feeder conveyor belt 17. The feeder belt 17 is positioned above the gluing unit 11 and is mounted in

ring form on a pair of end pulleys 18.

Immediately downstream of the unwinding roller 16 but in a higher position, is an air nozzle 19 and in a lower position, a sensor 20 such as a photocell. Then
5 at the exit of the unwinding roller 16 is positioned a first section of the sloped surface 21 leading to a second roller 22, defined as timer controlled and also driven by an independent motor. Downstream of this second timing roller 22, a second section of sloping
10 surface 23 is envisaged, leading to a third roller 24, defined as the suction roller and also driven by an independent motor. This third roller is a suction roller 24, connected to a vacuum source (not illustrated) and perforated on its total external side
15 surface with suction holes for this purpose.

This third suction roller 24 is positioned aligned under an upper roller 25 also driven by an independent motor, that can be moved vertically to approach or move away from the suction roller 24. The upper roller 25
20 is positioned exactly at the end of the first conveyor feeder belt 17 before the beginning of the second feeder belt 26, also positioned above the log 14 travel path, and also mounted in ring form on the two pulleys 18'. Alternatively, this second feeder belt 26 can be
25 simply an extension of the first belt 17.

Underneath the second feeder belt 26 and immediately

after the suction roller 24 is envisaged a glue distributor 27 of any type whatsoever. In the example provided, this glue distributor 27 comprises a wire 28 that is positioned in a crosswise direction in relation
5 to the travel direction of the final end 29 that protrudes from the paper log 14. In this example the wire 28 is closed loop type wound on end pulleys 30, in the example two, only one of which is illustrated and at least one of which being driven in continuous
10 rotation by a gear motor 31. The pulleys 30 are pivotally supported on the walls 32 of a container or tank 33 containing an adhesive.

Lastly a sloping evacuation surface 34 is envisaged over which the second feeder belt 26 is laid to ensure
15 the attachment between the terminal edge 29 of the log 14 and the log or roll itself, thus realising the tight glue attachment.

The operation of a glue unit for a terminal edge of a log of material 11 mounted in a machine to realise
20 finished logs is extremely simple.

The logs 14, wound practically to their final size are fed onto the sloping surface 13 in arrival from the previous rewinding machine on the production line.

Each single log 14 drops into an available pocket on
25 the rotating sorting device 15 and is therefore fed according to a pre-established sequence towards the

gluing unit 11 of the present invention.

In fact, the log 14 is placed on the unwinder roller 16 positioned in a lower position, and maintained by the upper feeder belt 17. The unwinder roller 16 rotates in
5 an anticlockwise direction, while the feeder belt 17 travels in a manner such that it exercises a certain pressure on log 14, while rotating it at the same time. In this manner, the terminal edge 29 of log 14 is transferred through the log 14 rotation to the blowing
10 element 19. This blowing element 19 acts to open the terminal edge away from the rest of the log 14 and photocell 20 (figure 1) detects whether the edge opening is sufficient and correct.

At this point the unwinding roller 16 stops and the
15 continuing forward travel motion of the upper feeder belt 17 induces log 14 to roll onto the first section of the sloping surface 21 to travel forward towards the second timing roller 22.

In this second position, the log, identified by numeral
20 14' in figure 2 and positioned between the second timing roller 22 and the upper feeder belt 17, is induced to roll on itself again at a certain angle α . Accordingly, at the end of the rotation action, roll
14' is set in a pre-established position with the end
25 of the terminal edge 29 in a pre-selected position in relation to the log diameter as shown in figure 2a.

Once this position of the terminal edge 29 of log 14' has been identified- i.e. its end calculated previously according to the diameter of the log being processed, the second timing roller 22 stops and log 14' is induced to roll forward again by the upper feeder belt 17. In fact this feeder belt 17 induces the log 14' to roll forward on the second sloping surface 23 having a pre-defined and established length, towards the suction roller 24. Thanks to this rolling action the log reaches its position with the free terminal edge 29 exactly in the area in contact with the suction roller 24 (indicated at 6 o'clock on the clock in figure 3). More precisely, the log, identified by 14" in figure 3, is positioned between the upper roller 25 and the suction roller 24.

At this point the suction roller 24 is activated to roll in a clockwise direction, and upper roller 25 is also activated to roll in a clockwise direction. Accordingly, the terminal edge 29 unwinds for the pre-determined quantity, as shown in figure 4.

Once this operation is completed, the halt of the upper roller 25 determines the forward travel of log 14'', while the terminal edge 29 is maintained in position by suction roller 24. In this manner, as is visible in figure 5, the upper belt 26 induces log 14'' to roll on the wire 28 that transfers the glue towards the roll

taking it from the container 33.

Once the glue has been applied, the terminal edge 29 is released by the suction roller 24 and the upper belt 26 induces the rolling of log 14'' down the sloping
5 evacuation surface 34 so that the glue remains inside the log between the log itself and the terminal edge 29, attaching them together.

A roller 35 positioned on the sloping evacuation surface 34 rotates so that the glued part is
10 transferred to the upper part of the log preventing the soiling of the surface.

In this way it is easy to understand how the second section of the sloped surface 23 positioned before the suction roller 24, acts to regulate and time the
15 terminal edge 29 position- i.e., the free end, according to the diameter of the log in question. This permits the unit to treat logs or various diameters with the simple rotation variation of the timing roller 22.

20 The rotation that is varied in this manner, like the final position of the different log assumed on the timing roller 22, permit the log, whatever its diameter, to reach the position above the suction roller 24, i.e. between the suction roller and the
25 upper roller 25, always in the said position with the final terminal edge 29 arranged exactly in the area in

contact with the suction roller 24 (6 o'clock on the clock).

In this manner the glue is correctly positioned on a log to glue the terminal edge of the log rapidly and in
5 a precise manner. This positioning action is performed in rapid succession with several logs undergoing the same process.

This method has resolved the problems described in the introduction in relation to gluing units of prior art
10 and used in the field of realising logs to produce toilet paper rolls, kitchen paper rolls, and the like.

The unit of the present invention thus conceived could be subjected to numerous modifications and variants, all of which remain within the scope of the invention
15 itself.

Moreover, in practice, all the materials used as well as their measurements and components can be of any type according to technical needs.

In a possible embodiment equivalent to that described
20 above, applying the inventive concept of the present invention, the elimination of the timing roller can be envisaged.

In this manner the section of sloping surface (21 or 23) would have a variable length according to
25 necessity, and the suction roller (24) and the gluing unit (27) would be moveable to approach or move away

from the unwinding roller (16) according to the diameter of the log on the machine.

This possible arrangement would also realise a gluing unit for a terminal edge of a log according to the
5 present invention.